ESP Technology

Electrophysical Separation Process

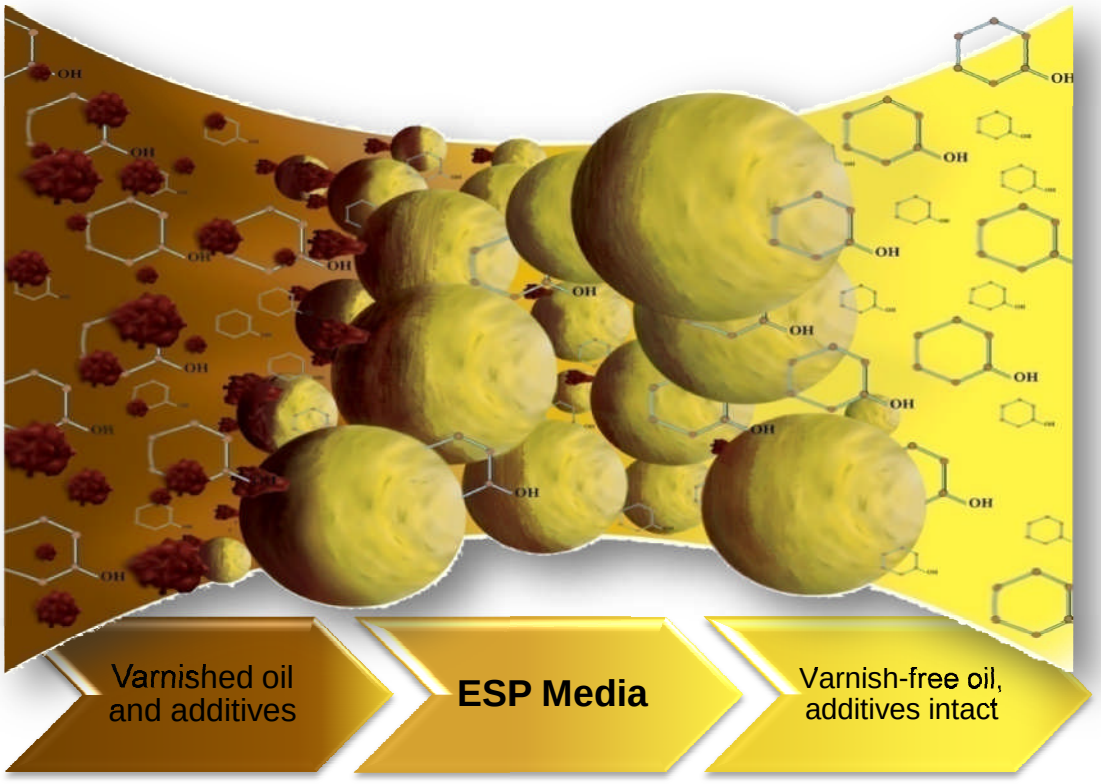
Turbine Oil Varnish Mitigation

Fluitec International introduces the final chapter in large frame gas turbine and steam turbine varnish mitigation. *Electrophysical Separation Process*™ uses a Fluitec-developed and patent-pending process to absorb dissolved *and* suspended oil degradation products – the cause of varnish.

Clean Bearing Pads found After ESP Installation

This process is accomplished with a technology that uses a selection of stable filtration materials. The Fluitec varnish mitigation solution is individually tailored to best match the turbine model, fluid chemistry, operational mode, lubricant condition and type and rate of fluid degradation. ESP Systems are used throughout the world to remove oil degradation products from turbine oil and to prevent trips and other problems associated with deposits.

The Fluitec team has been at the forefront of oil degradation research and turbine oil varnish mitigation for the last decade. We have more papers published on this topic than all of our competitors combined. This expertise and holistic philosophy is extended to each ESP System.



Electrophysical Separation Process™

ESP Technology Performance

The degradation products that make up varnish can exist in the oil in either a *dissolved* or *suspended* state depending upon its chemistry and temperature. Eliminating varnish requires that you continually remove these deposits that are in *both* physical states. This makes ESP technology a more effective varnish mitigation tool compared to competitive technologies.

This means that you will have lower varnish potential numbers in a shorter period of time. A matter of days will typically restore a heavily varnished turbine oil system. The ESP System with advanced condition monitoring technologies, on-site plant evaluation, Stat-Free lube oil filters and world-class expertise…finally a *proven solution* to varnish is at hand.

Rapid attraction and retention of varnish-producing contaminants

ESP Systems - Overview

The ESP Products are designed to be either permanently installed (ESP-136) or rotated around to various lubrication assets at your plant (ESP-336). Each system integrates ergonomics with the highest manufacturing integrity. The system has been engineered for simple installation, operation and maintenance; whether you're installing it on a large frame peaking gas turbine or small base-loaded steam turbine system.

	ESP-136	SP-336
Length	24"	40"
Width	24"	24"
Height	48"	48"
Weight	500 lbs	800 lbs
Power	115V, 6A, Single Ph	460V, 2A, 3-Ph
Flow Rate	0.6gpm	2.8gpm
Motor	1/3 HP	1 HP
Inlet/Outlet Connection	½" NPT	¾" NPT
Drain	¼" NPT	½" NPT
Seals	Buna-N	
Enclosure	TEFC	
Additional Filtration	5-µm Post Filter	5-µm Post Filter
Other features	Sampling ports, sensor-ready	
Reservoir Size (Depends upon oil type, contamination and application)	30,000 liters Designed for permanent installation.	80,000 liters Designed to treat multiple reservoirs at one site.
Viscosity Range	22-68cSt @ 40°C	
Preferred Fluid Temp	40 – 70°C	

ESP 136 being installed on a Frame 6B

This Product Information Sheet is Subject to Technical Modifications

Case Study 1

This large frame GE 7FA peaking plant had problematic IGV valve performance, resulting in costly fail-to-start conditions and unit trips. The plant had electrostatics already installed and had tried depth media filters to no avail. Within a week after installed Fluitec's ESP-336 System, their varnish problems disappeared and their oil was returned to normal level.

ESP-336 on a GE 7FA Unit

Case Study 2

ESP-336 being rotated around a combined cycle plant to maintain 4 turbine oil reservoirs

A combined cycle plant suffered from varnish-related trips that had a significant impact on their outage schedules. Every trip was assessed 8 starts and they were required to take their unit offline and perform an inspection after ever 50 starts. The last minute schedule changes were costly both in terms of the plant's O&M budget and the employee's bonuses and scheduled time off.

The plant already had an "agglomeration" system installed but still had unacceptable varnish potential values. They decided to use Fluitec's ESP-336 unit to rotate through-out their 3 GTs and one ST, where all of their oil is now in "normal" condition. More importantly, the plant's reliability increased from 94% to 100% and the plant's personnel are now on track to receive all of their scheduled bonuses.